

Remarks

By this amendment, claims 1-28 have been cancelled, claims 29, 41 and 44 have been amended. Thus, claims 29-58 are now active in the application. Reexamination and reconsideration of the application are respectfully requested.

In items 3-14 on pages 2-21 of the Office Action, claims 29-54 and 56-58 were rejected under 35 U.S.C. §103(a) as being unpatentable over Eleyan et al. (US 6,144,370) in view of Houston (US 5,168,221) or as being unpatentable over Eleyan et al. in view of Houston, and further in view of one or more of Yokoji et al. (US 6,909,422), Mailey et al. (US 5,237,311), Mimlitch et al. (US 5,171,978), Tuovinen et al. (US 6,509,888), Bruneau et al. (US 2002/0054011), and Ideno (JP 64-24447). These rejections are respectfully traversed and are believed further inapplicable to the present claims as now amended, for the following reasons.

In the main rejection (presented in item 4 on pages 2-5 of the Office Action), the Examiner took the position that the Eleyan et al. patent discloses (in the embodiment of Figs. 13 and 14) a trackball device comprising: a sphere (200) including magnetic material, first, second and third supporting members (94, 94, 36) supporting the sphere 200, a rotation detector, a controller, and an informer 106 including electromagnets 106 (a-j in Fig. 13), wherein the sphere is disposed in a magnetic flux circuit generated by the electromagnets (a-j), but that Eleyan does not disclose that the magnetic flux of the magnetic flux circuit goes from the electromagnet through the first supporting member, the sphere, and the second supporting member, and returns to the electromagnet, with the sphere being located in the magnetic flux circuit between the first and second supporting members, as required by claims 29, 41 and 44. The Examiner cited the Houston patent for disclosing a magnetic flux circuit (Fig. 19), wherein the magnetic flux “goes from an electromagnet (124 in Fig. 19) through a first supporting member (N member in Fig. 19), said sphere (122 in Fig. 19), and said second supporting member (S member in Fig. 19), and returns to said electromagnet, with said sphere being located in said magnetic flux circuit between said first and second supporting members (Fig. 19).”

According to the Examiner “it would have been obvious to one of ordinary skill in the art to replace the electromagnets of Eleyan with the electromagnet of Houston,”...so as to allow “a varying amount of current to effectively lock the ball in place and apply stronger feedback forces (Houston; col. 13, lines 42-51).” The Examiner further indicated (in the middle of page 4 of the Office Action) that, in the combination envisioned by the rejection, “upon the replacement of

Eleyan's electromagnets with those taught by Houston, the first and second supports of Houston will support the sphere of Eleyan in concert with the third support of Eleyan."

It is respectfully submitted that, contrary to this position taken by the Examiner, a person having ordinary skill in the art would not have found it obvious to modify the Eleyan trackball device as suggested by the Examiner in view of the Houston patent, for at least the following reasons.

First, the configuration shown in Fig. 19 of Houston is that of a variable magnetic pivot joint between the structure or element 121 and the spherical head 122, wherein an electromagnet 123 integrally formed with the structure 121 is energized by electrical current flowing through the coiled wiring 124. The magnetic field flowing through the spherical head 122 can be varied in intensity "to either provide a sliding contact of the element 121 over the head 122, or, by increasing the current, lock the pivot joint to a point where a large amount of torque will have to be applied between the element 121 and the head 122 to counteract the magnetic bond" (see column 13, lines 28-41). Thus, in the Houston patent, the electromagnet 123 is simply varied in its magnetic force in order to provide more or less magnetic attraction of the spherical head 122, to provide for a virtual brake against rotation of the sphere or, on the other hand, allow for relatively easy sliding between the sphere 122 and the structure 121.

However, there is no suggestion whatsoever in the Houston patent of the north and south poles (N, S) of the electromagnet 123 being used as supports on which the spherical head 122 rests. In fact, Fig. 19 shows the spherical head 122 disposed below the north and south poles of the electromagnet 123. Therefore, it is submitted that, even assuming *arguendo* that a person of ordinary skill in the art would have found it obvious to utilize the north and south poles of the electromagnet 123 of Houston in the arrangement shown in Figs. 13 and 14 of Eleyan, there is no basis to consider that the north and south poles of the electromagnet 123 would be used as first and second supports on which the sphere 200 (of Eleyan) would rest. In this regard, it is further noted that using the electromagnet 123 in place of the electromagnets (a-j) of Eleyan would not have resulted in the north and south poles of the electromagnet constituting supports on which the sphere 200 would rest. In Eleyan, the electromagnets (a-j) do not constitute supports; rather, in Eleyan, the supporting members are the elements 36, 94, 94. If the supporting members 94, 94 of Eleyan were for some reason removed in favor of the electromagnet 123 of Houston, then the combination would be lacking the ability to detect rotation of the sphere since the rotation is

detected by the rotation detectors 94, 94 (and, as recognized by the Examiner, the independent claims 29, 41 and 44 of the present application require the inclusion of a rotation detector).

Accordingly, for these reasons, it is submitted that a person having ordinary skill in the art would not have found it obvious to modify the trackball device of Eleyan in the specific fashion suggested by the Examiner, because such modification to utilize the north and south poles of the electromagnet 123 of Houston in place of the electromagnets (a-j) of Eleyan and also as supporting members on which the sphere 200 rests, is simply not suggested by the references in any way. The rotation detectors 94, 94 and idler 36 shown in Figs. 13 and 14 of Eleyan already provide the necessary 3-point support from below the sphere 200, and no additional support would be necessary or desirable.

Second, it is submitted that the modification of Eleyan in view of Houston as suggested by the Examiner would render the Eleyan arrangement inoperable for an intended purpose thereof and, as such, it is submitted that the Eleyan patent teaches away from any such modification.

Specifically, the Examiner has suggested that the electromagnets a-j of Eleyan (Fig. 13) be replaced with the electromagnet 123 shown in Fig. 19 of the Houston patent. However, doing so would mean that the "sophisticated version" (see column 8, line 6 of Eleyan) of the trackball device of Eleyan would no longer have its desired functional flexibility which, for example, allows the sphere 200 to actually be pulled, for example, in the direction indicated by the arrow in Fig. 13 by the sequential energization of electromagnets (a-j) (e.g. energizing the electromagnets in the sequence a-b, b-c, c-d, e-f, etc., as described at column 8, lines 44-47). The combination of Eleyan and Houston as suggested by the Examiner would merely allow for more or less electromagnetic force against the sphere 200 to make rotation thereof harder or easier; it would not allow for selective pulling of the sphere 200 in a given direction since it would not then be possible to sequentially energize a plurality of electromagnets (a-j) to magnetically act upon the multitude of cylindrical magnets 100 provided in the sphere 200.

As such, it is submitted that a person of ordinary skill in the art would clearly not have found it obvious to modify Eleyan in view of Houston in the manner suggested by the Examiner, not only for the reasons discussed above as to why there is no suggestion or desire in the references to utilize the north and south poles of the electromagnet 123 of Houston as supporting members, but due to the fact Eleyan teaches away from the Examiner's suggested modification

of Eleyan since such modification would prevent the desired functionality provided by the Eleyan arrangement in which the trackball can be rotatably pulled in the direction of the arrow in Fig. 13 by the sequential energization of the plural electromagnets (a-j).

Thus, it is believed very apparent that a person having ordinary skill in the art would have not found it obvious to modify the Eleyan configuration in the manner suggested by the Examiner in view of the Houston patent. Accordingly, it is respectfully submitted that claims 29, 41 and 44, as well as the claims depending therefrom, would not have been obvious to a person of ordinary skill in the art in view of the Eleyan and Houston references. Therefore, it is submitted that these claims are clearly allowable. The Yokogi et al., Mailey et al., Mimlitch et al., Tuovinen et al., Bruneau et al. and Ideno references were cited by the Examiner for teaching various particular features of the claims, but these teachings of these additional references are clearly such that they would not have obviated the above-discussed shortcomings of the Eleyan et al. and Houston patents.

In item 15 on pages 21 and 22 of the Office Action, claim 55 was rejected under 35 U.S.C. §103(a) as being unpatentable over Eleyan et al. in view of Noguchi et al. (US 5,639,168). This rejection is respectfully traversed for the following reasons.

The Examiner cited the Eleyan et al. patent for disclosing a trackball device comprising: a sphere 200 including magnetic material, a support (108, 36, 94) to rotatably support the sphere, a rotation detector 94, a controller, and an informer 106 including electromagnets (a-j). As recognized by the Examiner, the Eleyan patent does not disclose that the sphere 200 is formed of one of martensite stainless steel and ferrite stainless steel. Accordingly, the Examiner cited the Noguchi patent for disclosing "forming ball bearings out of martensite stainless steel (claim 9 for example)." The Examiner concluded that because both Noguchi and Eleyan are "from the same field of endeavor namely the design and manufacturing [of] small metallic spheres,"... "it would have been obvious to one of ordinary skill in the art to construct the sphere of Eleyan out of martensite stainless steel as taught by Noguchi for the benefit of martensite's high corrosion-resistance."

However, as described at column 8, lines 6-57 of the Eleyan patent, the magnetic sphere 200 of Eleyan is not formed of a single magnetic material but rather "has a plurality of cylindrical magnets 100 oriented so that the south poles of the magnets are toward the center of a sphere 200 composed of a ferromagnetic material such as soft iron, and the north poles aim

outwards.” The use of these plural magnets 100 allows the plural individual magnets 100 to be acted upon by the plural electromagnets (a-j) shown in Fig. 13 of Eleyan.

Accordingly, the Examiner’s suggestion to replace the Eleyan sphere 200 having the plurality of cylindrical magnets 100, with a sphere disclosed in Noguchi as being a ball bearing for supporting a spindle rotating at high speed, would have rendered the functionality of Eleyan inoperable in that replacing the sphere 200 of Eleyan with a single-material sphere would prevent the electromagnets (a-j) of Eleyan from acting upon the individual cylinder magnets 100 and, for example, allowing the functionality of the rotatable pulling of the sphere 200 in the direction of the arrow in Fig. 13 of Eleyan to provide the desired tactile feedback. Therefore, even if it could be said that the use of a particular material in a ball bearing used in a high speed rotation spindle would render obvious the use of such material in a sphere used for a trackball device, doing so in this particular situation of Eleyan et al. would have not been obvious because it would have rendered the Eleyan arrangement inoperable for an intended purpose thereof.

Furthermore, it is submitted that the disclosure of a particular material for a ball 8 of a ball bearing used to support a rotation spindle 1 would not have caused a person of ordinary skill in the art to modify a sphere of a trackball device to use the same material. The usage and condition under which a ball of a ball bearing in a high speed rotation spindle and those of a sphere of a trackball device are completely different; the ball of the ball bearing, as described in the Noguchi patent, is subjected to high loads and high-frequency rotation, whereas the sphere 200 of the Eleyan trackball device is not subjected to such high load and is also not subjected to the high-frequency rotation.

Accordingly, it is submitted that a person of ordinary skill in the art would clearly not have found it obvious to modify Eleyan by replacing the sphere 200 thereof with a sphere formed only of martensite stainless steel, in view of the disclosure in Noguchi et al. of the use of martensite stainless steel for a ball of a ball bearing used to support a rotation spindle. Therefore, it is respectfully submitted that claim 55 is clearly allowable over the prior art of record.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is earnestly solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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